

ART 34 AMDT

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11/09/2004

1

Specification

Method for Adjusting a Spray Dampener

The invention relates to a method for setting up a spray dampening unit in accordance with the preamble of claim 1, 2, 39 or 40.

A dampening unit for an offset printing press is known from German Published, Examined Patent Application DE 1 611 313, wherein a dampening agent is atomized pulse-like at a selectable pulse length as a function of the number of revolutions of a forme cylinder, and is intermittently applied to the surface of a roller of the dampening unit by means of nozzles. German Published, Examined Patent Application DE 1 761 313 complements DE 1 611 313 to the extent that a pulse length and pulse sequence frequency can be adjusted, wherein the pulse length is greater at a low printing speed and shorter at a high printing speed, or the number of spray pulses emitted per revolution of the forme cylinder is higher at a low printing speed and lower at a higher printing speed.

A spray dampening unit of a printing press is known from USP 2,231,694, wherein the nozzles eject a dampening agent in an adjustable amount at predetermined chronological intervals onto a dampening roller.

A spray dampening unit of a printing press is known from USP 5,038,681, wherein a dampening agent can be applied by means of nozzles to the surface of a roller of the spray dampening unit at a fixed pulse length, but with a variable pulse sequence spacing as a function of the number of

ART 34 ANDT

11/09/2004

revolutions of a forme cylinder.

A spray dampening unit of a printing press is known from DE 100 05 908 A1, wherein a surface, preferably of a

11/09/2004

5

spray at different frequencies because of a different requirement of the amount of moisture existing over the length of the roller, so that a beating interference between the nozzles occurs, and therefore a very uneven application of dampening agent.

The object of the invention is based on producing a method for setting up a spray dampening unit.

In accordance with the invention, this object is attained by means of the characteristics of claims 1, 2, 39 or 40.

The advantages to be gained with the invention lie in particular in that the described disadvantageous effect is lastingly counteracted in that, if not generally, then at least for a defined number of sequential revolutions of the rotating body to be dampened, synchronization with the spraying frequency is prevented for a press speed of the printing press which, though arbitrary, does at least not change at the time of the setting, in order to achieve a distribution of the dampening agent along the circumference of the rotating body which is as uniform as possible, and therefore free of interference. The undesired beating interference, i.e. the overlaying of the dampening agent on the same point of the circumference of the rotating body does not occur because, matched to the press speed of the printing press, and also as a function of the distributive behavior of the spray dampening unit in connection with different ranges of rotation frequency of the roller, a non-interfering spraying frequency, which also does not generate

ART 34 AMDT

11/09/2004

interferences, is set, preferably by means of programming techniques, and is also updated as required, in particular in case of a change of the press speed of the printing press. An operation free of beating interference can also be achieved if the on- and off-times of the spray nozzles are changed within the scope of defined correlations. The proposed methods permit settings of the spraying frequency

11/09/2004

19

Claims

1. A method for setting a correlation between the duration of a period (T_{A01}) of at least one spray nozzle (01) of a spray dampening unit, which delivers a dampening agent (02) in discontinuous flow amounts, and the duration of a revolution (T_{03}) of a forme cylinder (03), or the duration of a revolution (T_{04}) of a damping unit roller (04) of the spray dampening unit, wherein the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, is composed of the duration of delivery (T_{On}) of the spray nozzle (01) and an off-time (T_{Off}) of the spray nozzle (01), characterized in that the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, or a whole-number multiple of this duration of the period (nT_{A01} , wherein $n = 1, 2, 3 \dots$), is set in comparison with the duration of the revolution (T_{03}) of the forme cylinder (03), the duration of the revolution (T_{04}) of the dampening unit roller (04), or their whole-number multiples (nT_{03} , nT_{04} , wherein $n = 1, 2, 3 \dots$) in such a way that during the operation of the spray dampening unit the dampening agent (02) is applied again at its complete dosage to the same location on the circumference (U_{03}) of the forme cylinder (03), or of the circumference (U_{04}) of the dampening unit roller (04), at the earliest starting at the third revolution of the forme cylinder (03), or of the dampening unit roller (04).

2. A method for setting a correlation between the

ART 34 AMDT

11/09/2004

duration of a period (T_{A01}) of at least one spray nozzle (01) of a spray dampening unit, which delivers a dampening agent (02) in discontinuous flow amounts, and the duration of a revolution (T_{03}) of a forme cylinder (03), or the duration of a revolution (T_{04}) of a damping unit roller (04) of the spray dampening unit, wherein the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, is composed of the duration of delivery (T_{On}) of the spray nozzle (01) and an off-time (T_{Off}) of the spray nozzle (01), characterized in that the duration of the period (T_{A01})

11/09/2004

20

within which the dampening agent (02) is delivered, or a whole-number multiple of this duration of the period (nT_{A01} , wherein $n = 1, 2, 3 \dots$), is set as a function of the diameter (D_{03}) of the forme cylinder (03), or of the diameter (D_{04}) of the dampening unit cylinder, in such a way that during the operation of the spray dampening unit the dampening agent (02) is applied again at its complete dosage to the same location on the circumference (U_{03}) of the forme cylinder (03), or of the circumference (U_{04}) of the dampening unit roller (04), at the earliest starting at the third revolution of the forme cylinder (03), or of the dampening unit roller (04).

3. The method in accordance with claim 1 or 2, characterized in that during the operation of the spray dampening unit the dampening agent (02) is applied again at its complete dosage to the same location on the circumference (U_{03}) of the forme cylinder (03), or of the circumference (U_{04}) of the dampening unit roller (04), at the earliest starting at the tenth revolution of the forme cylinder (03), or of the dampening unit roller (04).

4. The method in accordance with claim 1 or 2, characterized in that the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, or a whole-number multiple of this duration of the period (nT_{A01} , wherein $n = 1, 2, 3 \dots$), during the operation of the spray dampening unit corresponds during none of the durations of the revolutions (T_{03} , T_{04}) of the forme cylinder (03) or the

11/09/2004

dampening unit roller (04) to the duration of the revolution (T_{03}) of the forme cylinder (03), the duration of the revolution (T_{04}) of the dampening unit roller (04), or their whole-number multiple (nT_{03} , nT_{04} , wherein $n = 1, 2, 3 \dots$).

5. The method in accordance with claim 1 or 2, characterized in that the spray nozzle (01), which is arranged fixed in place in regard to the dampening unit roller (04) at least during the delivery of the dampening agent (02), delivers the dampening agent (02) along the circumference (U_{04}) of the dampening unit roller (04).

6. The method in accordance with claim 5, characterized in that the dampening unit roller (04) receives the dampening agent (02) along its circumference (U_{04}) in the course of its rotation.

11/09/2004

7. The method in accordance with claim 1 or 2, characterized in that the dampening agent roller (04) transfers the dampening agent (02) at least in part to the forme cylinder (03).

8. The method in accordance with claim 1 or 2, characterized in that the duration of the delivery (T_{On}) of the spray nozzle (01), its off-time (T_{Off}), or both times (T_{On} , T_{Off}) can be variably set.

9. The method in accordance with claim 1 or 2, characterized in that the duration of the period (T_{A01}) is variable.

10. The method in accordance with claim 1 or 2, characterized in that a chronological difference (ΔT_1) between the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit (04), and the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, or a whole-number multiple of this duration of the period (nT_{A01} , with $n = 1, 2, 3, \dots$) is greater than the duration of the delivery (T_{On}) of the spray nozzle (01), if the duration of the period (T_{A01}), within which the dampening agent (02) is delivered, or a whole-number multiple of this duration of the period (nT_{A01} , with $n = 1, 2, 3, \dots$) is less than the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit roller

ART 34 ANDT

11/09/2004

(04) .

11. The method in accordance with claim 1 or 2, characterized in that the duration of the period (T_{A01}) within which the dampening agent (02) is delivered is set to a value, which lies outside of an interval (X), whose lower threshold value (t_u) is formed by a whole-number multiple $((n+1) * T_{03}, (n+1) * T_{04}, \text{wherein } n = 1, 2, 3 \dots)$, of the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit

11/09/2004

roller (04), which next follows the previously mentioned duration of the period (T_{A01}), and is reduced by the duration of delivery (t_{on}) of the spray nozzle (01), and whose upper threshold value (t_o) is formed by the whole-number multiple $((n+1) * T_{03}, (n+1) * T_{04}$, wherein $n = 1, 2, 3 \dots$), of the duration of the revolution (T_{03}) of the forme cylinder (03), or the duration of the revolution (T_{04}) of the dampening unit roller (04), which next follows the duration of the period (T_{A01}), if the duration of the period (T_{A01}), within which the dampening agent (02) is delivered, is greater than a whole-number multiple $((n+1) * T_{03}, (n+1) * T_{04}$, wherein $n = 1, 2, 3 \dots$), of the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit cylinder (04), which directly precedes the lower threshold value (t_u).

12. The method in accordance with claim 1 or 2, characterized in that in a spray dampening unit with several dampening unit rollers (04) a total time (T), consisting of a duration of a period (T_{A01}), within which the dampening agent (02) is delivered by the spray nozzle (01) to the damping unit roller (04), and a duration of transport (T_{TR}), required by at least one further dampening unit roller (04) between its receipt of the dampening agent (02) until the at least partial transfer thereof to the forme cylinder (03), is not equal to a whole-number multiple of the duration of the revolution (nT_{03} , wherein $n = 1, 2, 3 \dots$) of the forme cylinder (03).

ART 34 AND F

11/09/2004

13. The method in accordance with claim 1 or 2, characterized in that a film consisting of the dampening agent (02) of a layer thickness of 1 μm to 10 μm is applied to the forme cylinder (03).

14. The method in accordance with claim 8, characterized in that the duration of the delivery (T_{on}) of the spray nozzle (01), its off-time (T_{off}), or both times (T_{on} , T_{off}) are set in such a way that the desired correlation between the duration of the period (T_{A01}) for delivering the dampening agent (02) and the duration of the rotation (T_{03}) of the forme cylinder (03) or of the duration of rotation (T_{04}) of the dampening unit roller (04) is met.

11/09/2004

15. The method in accordance with claim 14, characterized in that setting of the duration of the delivery (T_{On}) of the spray nozzle (01), its off-time (T_{Off}), or both times (T_{On} , T_{Off}) takes place as a function of the duration of the rotation (T_{03}) of the forme cylinder (03) or the duration of the rotation of the dampening unit roller (04).

16. The method in accordance with claim 14, characterized in that setting of the duration of the delivery (T_{On}) of the spray nozzle (01), its off-time (T_{Off}), or both times (T_{On} , T_{Off}) takes place while taking into consideration a gear ratio existing between the forme cylinder (03) and the dampening unit roller (04) because of different diameters (D_{03} , D_{04}).

17. The method in accordance with claim 1 or 2, characterized in that the duration of delivery (T_{On}) of the dampening agent (02) periodically delivered by the spray nozzle (01) and the duration of its period (T_{A01}) start at the same time.

18. The method in accordance with claim 1 or 2, characterized in that the duration of the period (T_{A01}) within which the dampening agent (02) is delivered, or the duration of the period (T_{A03}) of the forme cylinder (03) for receiving the dampening agent (02), are at least double the duration of the revolution (T_{03}) of the forme cylinder (03).

19. The method in accordance with claim 10,

ART 34 AMDT

11/09/2004

characterized in that the difference (ΔT_1) between the duration of the revolution (T_{03}) of the forme cylinder (03) and the duration of the period (T_{A01}) during which the dampening agent (02) is delivered, or of the duration of the period (T_{A03}) for receiving the dampening agent (02), or their whole-number multiples (nT_{A01} , nT_{A03} , wherein $n = 1, 2, 3 \dots$) is at most one-tenth of the duration of rotation (T_{03}) of the forme cylinder (03).

11/09/2004

24

20. The method in accordance with claim 11, characterized in that the duration of the interval (X) is at most one-tenth of the duration of rotation (T_{03}) of the forme cylinder (03).

21. The method in accordance with claim 10 or 11, characterized in that the duration of rotation (T_{03}) of the forme cylinder (03) is not equal to a whole-number multiple of the difference ($n\Delta T_1$) or of the interval (nX), wherein each is $n = 1, 2, 3 \dots$.

22. The method in accordance with claim 1 or 2, characterized in that the spray nozzle (01) delivers the dampening agent (02) to at least one rotating dampening unit roller (04), and the dampening unit roller (04) transfers the dampening agent (02) at least in part to the forme cylinder (03) at a contact point (06) with the forme cylinder (03).

23. The method in accordance with claim 1 or 2, characterized in that several rotating dampening unit rollers (04) are provided, wherein one of the dampening unit rollers (04) receives the dampening agent (02) delivered by the spray nozzle (01), and transfers it at least in part to a subsequent dampening agent roller (04) at a contact point (07).

24. The method in accordance with claim 23, characterized in that the dampening rollers (04) differ from each other in their diameter (D_4) or the duration of their

ART 34 AMDT

11/09/2004

revolution (T_{04}).

25. The method in accordance with claim 22, characterized in that the diameter (D_4) of at least one dampening unit roller (04) is less than a diameter (D_3) of the forme cylinder (03).

ART 34 ANDT

11/09/2004

25

26. The method in accordance with claim 10 or 11, characterized in that the correlations mentioned in regard to the duration of the revolution (T_{03}) of the forme cylinder (03) apply correspondingly to the correlation between the duration of the period (T_{A01}) within which the dampening agent (02) is delivered and the duration of the revolution (T_{04}) of the dampening unit roller (04).

27. The method in accordance with claim 1 or 2, characterized in that the correlations mentioned in regard to the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit roller (04) apply at least in regard to an upper third of the value range of the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit roller (04).

28. The method in accordance with claim 1 or 2, characterized in that the correlations mentioned in regard to the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit roller (04) apply over the entire value range of the duration of the revolution (T_{03}) of the forme cylinder (03) or the duration of the revolution (T_{04}) of the dampening unit roller (04).

29. The method in accordance with claim 1 or 2, characterized in that a total time (T), consisting of a duration of a period (T_{A01}), within which the dampening agent

11/09/2004

(02) is delivered by the spray nozzle (01) to the damping unit roller (04), and a duration of transport (T_{TR}), required by the at least one dampening unit roller (04) between its receipt of the dampening agent (02) until the at least partial transfer thereof to the forme cylinder (03), is not equal to a whole-number multiple of the duration of the revolution (nT_{03} , wherein $n = 1, 2, 3 \dots$) of the forme cylinder (03).

30. The method in accordance with claim 29, characterized in that a time difference (ΔT_2) between

11/09/2004

the duration of the revolution (T_{03}) of the forme cylinder (03) and the total time (T) is greater than the duration of delivery (T_{0n}) of the spray nozzle (01), if the total time (T) or a whole-number multiple of this total time (nT , wherein $n = 1, 2, 3 \dots$) is less than the duration of the revolution (T_{03}) of the forme cylinder (03).

31. The method in accordance with claim 29, characterized in that the total time (T) is set to a value, which lies outside of an interval (X), whose lower threshold value (t_u) is formed by a whole-number multiple $((n+1) * T_{03}$, wherein $n = 1, 2, 3 \dots$), of the duration of the revolution (T_{03}) of the forme cylinder (03), which next follows the total time (T) and is reduced by the duration of delivery (t_{0n}) of the spray nozzle (01), and whose upper threshold value (t_o) is formed by the whole-number multiple $((n+1) * T_{03}$, wherein $n = 1, 2, 3 \dots$), of the duration of the revolution (T_{03}) of the forme cylinder (03), which next follows the total time (T), if the total time (T) is greater than a whole-number multiple $((n+1) * T_{03}$, wherein $n = 1, 2, 3 \dots$), of the duration of the revolution (T_{03}) of the forme cylinder (03), which directly precedes the lower threshold value (t_u).

32. The method in accordance with claim 1 or 2, characterized in that at least one dampening unit roller (04) is arranged axially in respect to the forme cylinder (03).

33. The method in accordance with claim 1 or 2,

11/09/2004

characterized in that the spray nozzle (01) ejects the dampening agent (02) in a pulse-like manner.

34. The method in accordance with claim 1 or 2, characterized in that several spray nozzles (01), which are spaced apart from each other, are arranged in the axial direction of the forme cylinder (03), or at least of one of the dampening agent rollers (04).

35. The method in accordance with claim 8, characterized in that the duration of delivery (T_{On}) of the spray nozzle (01), its off-time (T_{Off}), or both times (T_{On} , T_{Off}) can be set to be variable by remote control from a control console of an assigned printing press.

11/09/2004

27

36. The method in accordance with claim 1 or 2, characterized in that the duration of delivery (T_{on}) of the spray nozzle (01), its off-time (T_{off}), or both times (T_{on} , T_{off}) can be set or updated, wherein the program determines at least one setting as the function of each value of the duration of revolution (T_{03}) of the forme cylinder (03), or of the duration of revolution (T_{04}) of the dampening unit roller (04), which meets the required correlation.

37. The method in accordance with claim 36, characterized in that the program provides a warning regarding an unfavorable or impermissible setting, which does not meet the required correlations.

38. The method in accordance with claim 36 or 37, characterized in that the program excludes a setting which does not meet the correlations.

39. A method for setting a spraying frequency of a spray dampening unit, having at least one spray nozzle (01) which applies dampening agent (02) and a roller (03, 04), which receives dampening agent (02), characterized in that the spraying frequency of the spray nozzle (01) is set as a function of the rotating frequency of the roller (03, 04) receiving dampening agent in such a way that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for a defined number of subsequent rotations of the roller (03, 04) receiving dampening agent, wherein this define time has at least the numerical value "2" or is

11/09/2004

greater than "2".

40. A method for setting a spraying frequency of a spray dampening unit, having at least one spray nozzle (01) which applies dampening agent (02) and a roller (03, 04), which receives dampening agent (02), characterized in that the spraying frequency of the spray nozzle (01) is set as a

function of the diameters (D_{03} , D_{04}) of the roller (03, 04) receiving dampening agent in such a way that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for a defined number of subsequent rotations of the roller (03, 04) receiving dampening agent, wherein this define time has at least the numerical value "2" or is greater than "2".

41. The method in accordance with claim 39 or 40, characterized in that, in connection with a spray dampening unit with several spray nozzles (01) in the axial direction of the roller (03, 04) receiving dampening agent, their spraying frequency is set in such a way that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for a defined number of subsequent rotations of the roller (03, 04) receiving dampening agent, wherein this define time has at least the numerical value "2" or is greater than "2".

42. The method in accordance with claim 39, 40 or 41, characterized in that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for two subsequent rotations of the roller (03, 04) receiving dampening agent.

43. The method in accordance with claim 39, 40 or 41, characterized in that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for five subsequent rotations of the roller (03, 04) receiving

ART 34 AMDT

11/09/2004

dampening agent.

44. The method in accordance with claim 39, 40 or 41, characterized in that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) at least for ten subsequent rotations of the roller (03, 04) receiving dampening agent.

ART 34 AMDT

11/09/2004

29

45. The method in accordance with claim 39, 40 or 41, characterized in that the spraying frequency avoids overlaying of sprayed-on dampening agent (02) for any arbitrary number of subsequent rotations of the roller (03, 04) receiving dampening agent.

46. The method in accordance with claim 39 or 40, characterized in that the spray nozzle (01) sprays the dampening agent (02) along the circumference (U₀₃, U₀₄) of the roller (03, 04) receiving dampening agent.

47. The method in accordance with claim 1, 2, 39 or 40, characterized in that it is employed in an offset rotary printing press.